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B. T. GALLOWAY, *Chief of Bureau.*

CULTIVATION OF WHEAT IN PERMANENT ALFALFA FIELDS.

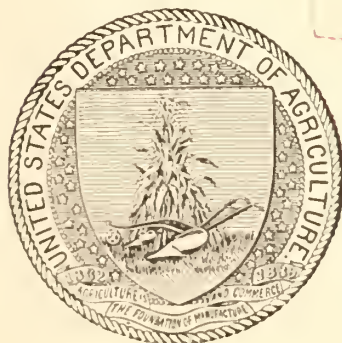
BY

DAVID FAIRCHILD, AGRICULTURAL EXPLORER.

SEED AND PLANT INTRODUCTION AND DISTRIBUTION.

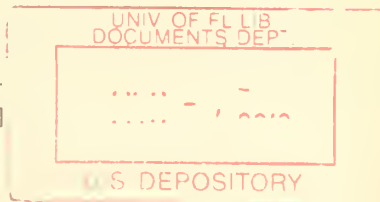
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CULTIVATION OF WHEAT IN PERMANENT ALFALFA FIELDS.^a

Wheat and alfalfa are being successfully grown together at the same time on the dry uplands of North Africa. Alfalfa, although doubtless one of the greatest forage crops in the world, has not so far in America been capable of utilization in a short rotation with wheat, but the recent experiments of a Swiss agriculturist in Algeria have proved that wheat and alfalfa can be grown to decided advantage in alternate rows.

During an exploring trip which the writer made for the Office of Seed and Plant Introduction and Distribution, in company with Mr. C. S. Scofield, a visit was made to Sétif, Algeria, where Mr. G. Ryf, in charge of the Swiss settlement there, has some remarkable experimental grounds. We noted, among the numerous interesting things with which Mr. Ryf was experimenting, a field of alfalfa planted in rows 3 feet apart, between which rows, he assured us, he grew every other year a crop of durum wheat. Since making this observation in Algeria in 1901 the attention of the writer has been called to the fact that such a rotation, if it can strictly be called a rotation, is not

^a Alfalfa is probably the greatest fodder crop now grown in America, and wheat still holds its place as one of our most important cultures. The immense areas of wheat land in the Northwest, and the spread of durum wheat cultivation into the arid Southwest, where alfalfa is the principal fodder crop, should make unusually interesting the experiment of Mr. Ryf as reported in this paper by Mr. Fairchild.

With the present increasing interest in dry-land farming in portions of the West, notably in Utah and Montana, the present paper is very timely, and measures should by all means be taken to give the method a proper trial.

The observations of which this is a report were made by Mr. Fairchild and Mr. C. S. Scofield during their explorations in Algeria in 1901, but at that time the experiments of Mr. Ryf had not progressed far enough to merit calling them to the attention of American cultivators.

A. J. PIETERS,
Botanist in Charge.

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Washington, D. C., November 19, 1904.

practiced in regions in America which are similar to the dry uplands of western Algeria so far as climate and soil are concerned, and it has seemed worth while to describe this simple method which Mr. Ryf has discovered and which he has now in satisfactory operation on his place.

In response to a letter of inquiry, the writer received a communication from Mr. Ryf, dated August 12, 1904, of which a free translation from the French follows:

I believe more and more firmly that lucern^a is destined to play an important rôle in all dry countries where forage is scarce. The value of the intercalary culture of cereals in lucern has been proved. I believe it to be rational and to solve the great problem of an economical manure crop. After numerous trials with planting lucern in rows at different distances apart, we have at last found that a distance of about 40 inches between double rows of the plant is most satisfactory. The distance between the single rows is uniformly about 4 inches. Formerly we sowed the lucern in single rows, but we have found it surer to sow it in double rows. With good seeders the work of sowing is not difficult. The space of 40 inches between the double rows of lucern we sow ordinarily with only three rows of wheat or other cereal, each row occupying about 7 inches and the double row of lucern 12 inches, making a total of 40 inches. The space between the two rows of lucern is cultivated two or three times. In one of these cultivations the earth is turned toward the rows of lucern; in the other, away from them. After each cultivation a harrow (and sometimes a roller) is run over the ground, providing there are stones or large clods. These spaces between the rows of lucern are sown only one year out of every two, the yield in forage during the year in which the ground is left fallow compensating largely for the loss which is incurred by not planting the ground. In very good soils our good indigenous varieties of lucern make such a growth that the rows join one another, notwithstanding the considerable distance of nearly 40 inches which separates them. A field during the fallow period looks as if it had been sown broadcast, or at least drilled in lines very close together. We get thus, on dry soil, without irrigation, two or three cuttings of lucern, and pasturage more or less abundant during the remainder of the year. We feared that lucern might injure the cereals planted between the rows, but there has been no reason for this fear. I would add that at the time of the plowing preparatory to sowing the ground we take pains to cut off with the colter and plowshare, both of which are kept well sharpened, masses of the lucern roots. This operation in a measure checks the growth of the latter during the vegetative period of the cereals; but being a plant of vigorous spreading habits, it soon sends out new roots and shoots in such a way that the following year it has regained all of its former vigor.

There are very considerable advantages in this method of culture. The lucern sends its roots from 1 to 3 meters (3.28 to 9.84 feet) deep into the subsoil and draws from it the water necessary for its growth. It absorbs, as well, nitrogen from the atmosphere, which is the other source of food. From the roots, which are amputated periodically, is secured a green fertilizer which, according to numerous experiments, is equivalent to a good dressing of barnyard manure. But this manure, in the form of amputated roots, plays still another rôle quite as important in dry land. It serves the purpose of a water reservoir. In fact,

^aThe French name *luzerne* is applied in Algeria, as elsewhere, to *Medicago sativa* Linn., which in America is called alfalfa.

these roots in decomposing become like little sponges which run through the soil, and in these the rain water accumulates. These roots, penetrating deeply, thus constitute reservoirs of humidity, at the same time breaking up and rotting in the soil and subsoil, in this way furnishing nourishment and moisture to the cereals which are grown between the rows, and playing the rôle of excavator at the same time.

Our indigenous varieties of lucern which have been acclimated in this region since Roman times are incomparably more valuable than the cultivated lucern called *de Provence* or *de Poitou*. The former varieties are as strong and hardy as the latter are exacting and delicate, and they will last for several centuries, if not always, defending themselves victoriously against the weeds, which they often kill in place of being killed by them. Among these indigenous species there is one which is in all respects superior, and we are doing our best to propagate this.

A number of cultivators have adopted the intercalary culture of lucern and cereals. One proprietor in Tunis wrote me recently that he was going to try 50 hectares (123.55 acres) of this intercalary culture. As for myself, I extend my cultures each year, and expect to sow next spring as large an area as the seed selected will permit. A severe storm on July 13 destroyed a large part of my lucern which had been cut for seed, which fact I regret exceedingly. I believe that our indigenous lucerns would grow in Montana and other of your cold and dry regions, but under these conditions there are certain precautions to be taken in order to bring the young plants to maturity. Once well established, no freezes would destroy them; of this I am convinced. Our climate on the high plateau of Algeria, although not so cold in winter, resembles singularly that of the dry States in the central and western portions of your country.

Whether or not a place for this unusual method of cultivation can be found in the drier regions of this country is well worth finding out, in view of the fact that so successful an experimenter and so practical a farmer as Mr. Ryf has pronounced it a commercial success in Algeria after several years of trial.

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